PROVISION FOR EXPLOSIONS

One of the operating difficulties with the open-hearth furnace lies in the fact that explosions of gas are likely to occur whenever the furnace is reversed. This difficulty is also met in all regenerative furnaces. These explosions vary in their intensity from slight puffs to heavy explosions and are due to the gas trapped in the gas regenerator meeting the air that is drawn into the stack flue. When the furnace is connected directly with the stack the puff of the explosion passes up the chimney and is rarely noticed. Similar explosions are not infrequent in blast furnace practice, and experience in that line has demonstrated the absolute necessity of providing explosion doors to relieve explosion pressures, as well as the necessity of making all the flues and settings gas tight and building them with buck stays of sufficient strength to stand the explosion stresses.

When boilers or economizers are connected with the furnace these explosions become of serious import and unless relief valves are provided of sufficient area to prevent excessive rises in pressure the settings will be damaged and numerous cracks will admit cold air, greatly reducing the efficiency of the waste heat installation.

Another cause of unsatisfactory results with waste heat boilers arises from the loss of sensible heat by the gases in passing through the flues. These flues are generally underground and close to the surface, and the ground above the flue is frequently so hot that it remains dry, except when very heavy rains occur. Exactly what the heat loss from this source will be depends upon the construction of the flue, the depth below the surface and the length of the flue. With waste heat utilization it is desirable that the flues should be well insulated and as short and direct as possible.

The waste-gas flues are frequently far from tight,

and when waste-heat boilers are installed the air leakage into the flues is much more serious than when they connect directly to the stack. Low temperatures at the bottom of the chimney in most metallurgical high-temperature furnaces should be viewed with suspicion, until checked by an analysis of the waste gases.